

Development of Starch Nanoparticles as Vehicles for Curcumin Delivery

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Abstract : Starch is a highly biocompatible, non-toxic, and biodegradable polymer. It is widely used in biomedical applications, including drug delivery systems and tissue engineering scaffolds. Curcumin, a phenolic compound found in the dried root of *Curcuma longa*, has been used as a nutritional supplement due to its antimicrobial, anti-inflammatory, and antioxidant effects. However, the major problem with ingesting curcumin by itself is its poor bioavailability due to its poor absorption and rapid metabolism. In this study, we report a novel methodology to prepare starch nanoparticles loaded with curcumin. The nanoparticles were synthesized via nanoprecipitation of starch granules extracted from native Andean potatoes (*Solanum tuberosum* ssp. and *Andigena* var *Huamantanga* varieties). The nanoparticles were crosslinked and stabilized by using sodium tripolyphosphate and Tween®80, respectively. The characterization of the nanoparticles loaded with curcumin was assessed by Fourier Transform Infrared Spectroscopy, Dynamic Light Scattering, Zeta potential, and Differential scanning calorimetry. UV-vis spectrophotometry was used to evaluate the loading efficiency and capacity of the samples. The results showed that native starch nanoparticles could be used to prepare promising nanocarriers for the controlled release of curcumin.

Keywords : starch nanoparticle, nanoprecipitation, curcumin, biomedical applications

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